

## **English Ivy: Landscape Plant or Deadly Killer**

### **Student Instructions**

#### **Background**

Biodiversity is simply the variety of life in an area. It includes all types of plants, animals, fungi, and microorganisms. A wide variety of organisms are necessary to maintain a healthy ecosystem and most organisms in an ecosystem are dependant on each other (interdependence). According to the Sierra Club, 'the "ecological services" provided by biodiversity include the supply of oxygen to the atmosphere, water purification, the prevention of floods and soil erosion, nutrient recycling, and pollination. Nearly half of all medicines used today originally came from wild organisms.'

(<http://www.sierraclub.ca/national/biodiv/biodiv/biodiv.html>)

Biodiversity is currently being reduced by a number of human activities including agriculture, development, and the introduction of non-native species. Non-native species are plant or animal species that do not naturally occur in an area. These might be introduced by a number of different means. Some, such as Kudzu and English Ivy, are brought to an area as landscape plants. Others, such as cheat grass, were brought to western regions to help feed cattle. Still others come to an area without knowledge of people, as did the zebra mussel, which colonized ships and eventually overran the great lakes.

Organisms compete for resources in the ecosystem. Some of these resources include nutrients, space, water, and sunlight for plants. When non-native species are introduced into an ecosystem, they often don't have any natural predators or diseases and thus there is nothing to control their spread. When climatic conditions are right for them, they tend to out compete native species. When these organisms are highly successful, they may cause other species to dwindle or even become extinct. Depending on the species, this may cause a chain reaction in the whole ecosystem because other species may have depended on that species for food or shelter.

The following activity will teach you one way that ecologists might assess the health of an ecosystem. You will calculate the diversity and percent cover of organisms in two areas from a State Park in West Linn, OR. One of the areas is what is called an Ivy Desert while the other closely approximates the native ecosystem.

#### **Materials**

- Two photos of the plants in Mary S. Young State Park in West Linn, OR
- A transparent grid (you can use the attached grid to make a copy on to a transparency for this activity).
- Another option is to download the "SpeciesMap.doc" MSWord file from the Teacher Resources section of the AFG website ([www.pbs.org/afg/teachers/birds/birds\\_sum.html](http://www.pbs.org/afg/teachers/birds/birds_sum.html)) You can use this file to do the activity on your computer. Simply grab the grid and drag it on top of the photo.

## Directions

1. Take one of the maps and fit the grid over the top of the map.
2. At every point where the lines on the grid cross, note what plant is there. Make a quick sketch of the plant and give it a name (Your teacher will tell you if you should name the species or not)
3. You may notice that the grid does not cover the entire picture. You are collecting a statistical representation of the species present. This is a similar challenge that you would face if you were taking the same measurements in the field.
4. Place your results in a data table (see example below)

Species	Sword fern		
Number	5		
Percent cover	20%		

5. Once you have counted all the different species in the area, calculate **percent cover**. To do this, determine the total number of individuals of each species and divide by 25 (the total number of points counted). For instance, if you counted five sword ferns, then  $5/25$  is 20%. Place these results in your data table.
6. Repeat 1-5 with the second map.
7. To calculate diversity, simply count the total number of different species found on each map.

## Analysis

1. How did percent cover and diversity for the Ivy Desert compare with those for the native species site?
2. Ivy is successfully competing for resources in this ecosystem. Competition for which resource does percent cover represent?
3. Why do you think experts call areas such as Map B an Ivy Desert?
4. How much forest floor was visible in the ivy desert? In the native forest? How do you think the amount of forest floor affects other organisms that try to get a foothold in the area?
5. If the ivy is allowed to grow unchecked, what do you think Mary S. Young State Park might look like in 10 years?
6. What is the impact of ivy on plant biodiversity in this area?
7. If the ivy is allowed to continue growing, what do you think the effect on the rest of the organisms in the ecosystem will be? (think about what you learned from the video on the Karner Blue Butterfly and wild Lupin).
8. Why is diversity of species important?
9. What can be done to recreate the natural biodiversity of this area?
10. Why do you think scientists use this method instead of counting each plant in an area?